



Era Aviation, Inc.

PROCESS SPECIFICATION

ERA AVIATION INC.

GULF COAST DIVISION
LAKE CHARLES, LOUISIANA

PROCESS SPECIFICATION NO. 4008

APPLICATION OF CONDUCTIVE COATING
SYSTEM FOR LIGHTNING PROTECTION

Prepared By: David K Murphy 5/10/90 DATE
Approved By: John A. Schaefer, Jr.
Engineering:
Quality Control: Dave Murphy
Production: Mark Jones
Mark Jones

ERA P S 4008

REV A

DATE 4/26/91

LOG OF REVISIONS

REVISION	BY DATE	PAGES AFFECTED	REVISION DESCRIPTION	APPROVED DATE
IR	5/10/90	ALL	INITIAL RELEASE	5/10/90
A	4/26/91	PAGE 2	ADDED INSPECTION REQUIREMENTS. APPLICATION PROCEDURES.	<i>P. Schwenk</i> 5/1/91
B	1/14/92	PAGE 1	ADDED PRIMERS TO MATERIAL LIST.	<i>P. Schwenk</i> 1/29/92
		PAGE 2	CHANGED DRYING TIME TO 48 HOURS.	

ERA P S 4008REV BDATE 1/14/92

APPLICATION OF CONDUCTIVE COATING SYSTEM

1. SCOPE

This specification establishes the requirements and procedures for application of conductive coating system for lightning protection.

2. MATERIALS

Lightning Guard
Series 599-A8574-1
2 Part Polyurethane System
Part A
Part B

Spraylat Corporation
716 South Columbus Ave.
Mount Vernon, NY 10550

Toluene

Primer Surfacers - Sandable
Epoxy Polyimide
MiL - P - 23377C
2 Part Primer
Part 1 - 910X 386
Part 2 - 513X 307

DeSoto, Inc.
Chicago Heights
Illinois

Super Koropon
2 Part Primer
Part - A 515X 400
Part - B 910X 350

DeSoto, Inc.
Chicago Heights
Illinois

Painter Tack Rag

Ditzler DX-50
Locally procured

3. PREPARATION

CAUTION - AVOID BREATHING VAPORS AND USE IN A WELL VENTILATED AREA. AVOID REPEATED CONTACT WITH SKIN. OBSERVE ALL PRECAUTIONS AND WARNINGS SHOWN ON MANUFACTURER'S LABEL AND MATERIAL SAFETY DATA SHEET. (SEE APPENDIX A)

3.1 Prepare surface to be painted by wiping clean with a tack rag.

3.2 Mask areas to be painted as required by applicable drawing, E. O., etc.

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APPLICATION OF CONDUCTIVE COATING SYSTEM

3.3 Prepare paint as follows:

3.3a Shake up copper component Part A until uniform.

3.3b Temperature of components shall be a minimum of 65 deg. F.

3.3c Add 100 parts paint (Part A) to 6 parts catalyst (Part B) by weight
OR
112 ozs. paint (Part A) to 16 ozs. (Part B) catalyst by volume.

3.3d Mix thoroughly.

3.3e Thin to recommended dilution ratio one part of paint to 0.5 parts of toluene.
(Note: Thinning to 1-1 by volume may produce runs and sags. Pot life at the dilution of 1 to 0.5 may be as little as two hours).

3.3f Use a standard air gun and pressure pot with agitator.

3.3g Use atomizing pressure between 40-60 PSI. Pressure pot pressure is 3-5 PSI.
(NOTE: Keep agitator working all the time. If spraying is stopped for more than 15 minutes, recirculate paint in hoses before spraying again).

4. APPLICATION

4.1 Spray wet film a minimum of 3 mils. thick.

4.2 System must dry for a minimum of 48 hours before final finish or top coat is applied. There is no requirement for a maximum time between application of conductive system and top coat.

4.3 After system has dried, lightly sand paint lines to provide feathered edge for finish top coat.

4.4 A primer surfacer may be added to smooth out dry areas. Do not sand any area prior to the application of primer surfacer. The primer surfacer may be sanded.

4.5 Sanding the conductive coating will cause a degradation in the conductive coatings ability to dissipate static electricity and lightning strikes.

ERA P S 4008REV BDATE 1/14/92**5. INSPECTION REQUIREMENTS**

- 5.1 Uniform covering of material; free of runs and sags.
- 5.2 Minimum film thickness of 2 mils dry film thickness.
- 5.3 After system has dried 24 hours check adhesion using pressure sensitive tape at random locations.
- 5.4 There should be less than 1 OHM resistance per 12 inches of conductive coating.

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APPENDIX A

1. SPRAYLAT TECHNICAL DATA SHEET
SERIES 599-A8574-1 LIGHTNING GUARD
2. MATERIAL SAFETY DATA SHEETS FOR:
TWO PART CONDUCTIVE COATING SYSTEM
599-A8574-1 PART A & B.

TOLUENE

SPRAYLAT CORP.716 SOUTH COLUMBUS AVENUE
MOUNT VERNON, NY 10550
(914) 699-3030 FAX: (914) 699-3035**TECHNICAL
DATA
SHEET****ENGINEERED INDUSTRIAL COATINGS**

LOS ANGELES, CA • CHICAGO, IL • GAINESVILLE, TX

SERIES 599-A8574-1

CONCENTRATE LIGHTNING GUARD COPPER CONDUCTIVE COATING

A sprayable, three-component polyurethane system using copper as the conducting agent. This system can be used on aircraft substrates, such as Kevlar, epoxy and fiberglass. It is able to withstand lightning strikes and passes Military Specifications MIL-B-5087 and MIL-STD-1757.

SYSTEM: Three-component, air dry.

SOLIDS
(A, B & C MIXED) 81 ± 3% by weight

DENSITY
(A, B & C MIXED) 20.7 lbs. ± 1.0/gallon

VOC:
(AS SUPPLIED) 3.93 lbs/gallon (0.47 kg/liter)

THINNER: Toluene

RECOMMENDED
DILUTION RATIO: 1 part base (Part B) to .5 parts thinner by volume,
then add part A and part C.

RECOMMENDED
MIXING RATIO: 7 parts base (Part B) to 1 part catalyst (Part A)
and 0.25 part retardant (Part C) by volume OR
100 parts base (Part B) to 6 parts catalyst (Part A)
and 1 part retardant (Part C) by weight

APPLICATION METHOD: Cup gun or pressure pot with agitation to keep
copper in suspension.

DRYING TIME: Force Dry: 30 minutes flash off at room temperature;
followed by 30 minutes @ 120°F (49°C); then 30 minutes
@ 160°F (71°C) OR Air Dry: 4 hours air dry at room
temperature.

HUMIDITY RESISTANCE: No significant change in resistivity when tested in
accordance with MIL-STD-202 Method 106 - 40 cycles;
MIL-STD-810 Method 507 Procedure 5 - 480 hours
cycling.

(CONTINUED OVER)

2. Transfer Part "B" to a larger container and dilute with toluene to the desired viscosity. Recommended dilution ratio is between:
 - a. 1:0.5 by volume (Part B:Toluene)
 - b. 1:1.0 by volume (Part B:Toluene)

Dilution ratio (a) results in high solids, higher viscosity and faster film build-up and also shorter pot life.

Dilution ratio (b) results in lower solids, lower viscosity and slower film build-up but longer pot life.

3. Add Part "A" and Part "C" to diluted Part "B" and mix thoroughly again.
4. Spray paint at 5 +/- 1 mils dry film thickness. Keep mixing constantly while spraying.
5. Flash off paint for 30 minutes at room temperature, then 30 minutes at 160°F OR air dry for 4 hours.
6. Check dry film thickness, conductivity and adhesion to the substrate.

NOTE: If paint increased viscosity being beyond usable pot life, do not dilute it with additional thinner, but dispose of it. Such paint cannot be used.

SPRAYLAT

CORP.

716 SOUTH COLUMBUS AVENUE
MOUNT VERNON, N.Y. 10550
(914) 699-3030**ENGINEERED INDUSTRIAL COATINGS**SERIES 599-A8574-1
CONCENTRATE LIGHTNING GUARD

A sprayable, two-component polyurethane system using copper as the conducting agent. This system can be used on aircraft substrates such as; Kevlar, epoxy, and fiberglass. It is able to withstand lightning strikes and passes Military Specifications MIL-B-5087 and MIL-STD-1757.

<u>SYSTEM:</u>	Two-component, air dry.
<u>RECOMMENDED MIXING RATIO:</u>	100 parts paint to 6 parts catalyst by weight OR 112 ozs. paint to 16 oz. catalyst by volume.
<u>SOLIDS (PART A & PART B):</u>	80% \pm 2% by weight; 38% \pm 2% by volume.
<u>DENSITY (PART A & PART B):</u>	19.5 lbs. \pm .2 lbs. per gallon
<u>RECOMMENDED DILUTION RATIO:</u>	1:1 by volume.
<u>THINNER:</u>	Toluene
<u>APPLICATION METHOD:</u>	Cup gun or pressure pot with agitation to keep copper in suspension.
<u>DRYING TIME:</u>	60 minutes air dry or) 25 minutes @ 160°F.) Dry to handle. 7 days @ Room Temperature - Thorough Cure.
<u>HUMIDITY RESISTANCE:</u>	No significant change in resistivity when tested in accordance with MIL-STD-202 Method 106- 40 cycles; MIL-STD-810 Method 507 Procedure 5 - 480 hours cycling.
<u>SKYDROL RESISTANCE:</u>	Passes 7 days immersion with no damage to film.
<u>SURFACE RESISTIVITY:</u>	0.3 ohms/square @ 2-3 mils dry film thickness.
<u>MINIMUM FILM THICKNESS:</u>	2 mils dry film.
<u>COVERAGE:</u>	650 sq. ft./gallon/mil @ 100% efficiency.
<u>POT LIFE:</u>	8 hours.
<u>SHELF LIFE:</u>	6 months.
<u>COATING SYSTEM:</u>	Prime substrate with MIL-P-23377. Apply Lightning Guard 599-A8574-1. Topcoat Lightning Guard with MIL-C-46168. System meets MIL-STD-210.

MATERIAL SAFETY DATA SHEET
FOR COATINGS, RESINS AND RELATED MATERIALS

PAGE 1

Manufacturer: SPRAYLAT CORPORATION
Address: 716 SOUTH COLUMBUS AVENUE, MT. VERNON, NY 10550
Telephone - NY: (914) 699-3030 (Emergency and Information)
CA: (213) 559-2335 (Emergency and Information)

Date of preparation: 7/07/89 (note: supersedes all previous MSDS)
Prepared by: Gaizar Hassonjee Phone number: (914) 699-3030

SECTION I PRODUCT IDENTIFICATION

Manufacturer's Code Identification: A85741BM
Product Class (Use): ELECTRICALLY CONDUCTIVE COATING
Trade Name: 599-A8574-1 LIGHTNING GUARD (CONCENTRATE) - PART B

HMIS Information: Health- 2 Flammability- 3
Reactivity- 0 Personal Protective Equipment-
HAZARD INDEX: 4= Severe 3= Serious 2= Moderate 1= Slight 0= Least

SECTION II HAZARDOUS INGREDIENTS

SECTION 313 SUPPLIER NOTIFICATION:

Those ingredients (if any) which have an asterisk (*) preceding the CAS# are subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372.

--- INGREDIENT(S) --- # MATERIAL DESCRIPTION	CAS #	% BY WT.	ACGIH-PPM TLV(TWA)	OSHA-PPM PEL	LEL V.P. OTHER LIMIT
01 TREATED COPPER	/* 7440-50-8	/ <75	/ 1.00/	1.00/	
	/	/	/	/	/STEL-2 MG/M3
07 TOLUENE	/* 108-88-3	/ <25	/ 100.00/	200.00/	1.2 24.
10 ETHYL 3-ETHOXY PROPIONATE	/ 763-69-9	/ <10	/NOT EST/	NOT EST/	1.1 1.
13 ARGENTUM	/* 7440-22-4	/ <10	/ .10/	.01/	
	/	/	/	/	/MG/M3
15 AMORPHOUS SILICA	/ 67762-90-7	/ <10	/ 5.00/	20.00/	
	/	/	/	/	/ACGIH-MG/M3
	/	/	/	/	/OSHA-MPPCF
	/	/	/	/	/AS RESP. DUST
18 TRIMETHYLBENZENE	/* 95-63-6	/ <10	/ 50.00/	NOT EST/	
20 AROMATIC HYDROCARBON/ (C9-C11)	/	/ <10	/NOT EST/	NOT EST/	
25 PGME ACETATE	/ 108-65-6	/ <10	/NOT EST/	NOT EST/	1.5 3.
	% LEAD		.00		
	% CHROMATE		.00		

This product contains no reported carcinogens or suspected carcinogens.

Based on section II ingredient(s) (18) prolonged overexposure to vapors may cause blood disorders or damage to blood forming organs.
 Based on section II ingredient(s) (15) may cause shortness of breath.
 Based on section II ingredient(s) (18) may cause bronchitis
 Based on section II ingredient(s) (07,20) chronic overexposure or ingestion of this material may cause kidney and liver injury.
 Based on section II ingredient(s) (01) chronic toxicity is confined to those persons suffering from Wilson's disease.
 Based on section II ingredient(s) (18) prolonged overexposure or ingestion may cause central nervous system depression/disorder.
 Based on section II ingredient(s) (07) prolonged overexposure may cause headache, nausea, loss of balance, coordination and consciousness, narcosis, coma and death due to respiratory failure. Repeated excessive exposure may also cause chronic adverse systemic effects.
 Based on section II ingredient(s) (01,07) direct contact with eyes may cause damage to the conjunctiva and cornea if not promptly removed.
 Based on section II ingredient(s) (20) may cause lung injury.
 Based on section II ingredient(s) (13) may cause life long disfigurement by depositing metal powder under the skin. May form pigmentation in lungs.
 Spray mist/Vapors of spray paints may cause irritation to the eyes, nose throat, upper respiratory tract, mucous membranes and skin.
 Based on section II ingredient(s) (01) this product is presumed to be slightly toxic.
 Based on section II ingredient(s) (07,18,25) this product is irritating to the mucous membranes.
 This product may cause nose, throat and upper respiratory tract irritation.
 Based on section II ingredient(s) (01) this product may be harmful if it is swallowed.
 Based on section II ingredient(s) (07,18,20) ingestion of this product will cause irritation of the gastrointestinal tract and may cause effects resembling those from inhalation of vapor.
 Based on section II ingredient(s) (15) pulmonary edema may develop with inhalation of high concentrations of this material.
 Based on section II ingredient(s) (20,25) this product may be moderately irritating to the eyes. Exposure can cause corneal injury.
 Based on section II ingredient(s) (01,07,10,20) this product may cause irritation, drying, cracking or dermatitis on prolonged exposure to skin.

FIRST AID:

EYE CONTACT: Flush with luke warm water for 15 mins. Seek physician immediately.

SKIN CONTACT: Flush wash with copious amounts of luke warm water. Remove contaminated clothing promptly. Contact a physician immediately.

INHALATION: Remove exposed individual to fresh air. Restore breathing if required. Contact a physician immediately.

INGESTION: Rinse mouth immediately. Give exposed individual 6 to 8 ounces of liquid. (Never give anything by mouth to an unconscious person.) Do NOT induce vomiting unless advised by a physician. Contact a physician immediately.

NOTICE - Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents

Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.
Eyewash stations and safety showers should be readily available in use and handling areas.

SECTION IX SPECIAL PRECAUTIONS

HANDLING AND STORING PRECAUTIONS:

Keep product containers cool, dry, and away from sources of ignition. Use and store this product with adequate ventilation. Do NOT smoke in storage areas. Keep containers tightly closed when not in use. Isolate from heat, electrical equipment, sparks and open flame. Sprinkler fire protection is desirable in areas of storage, handling and use.
Bond and ground metal containers when transferring liquid.
Personnel should avoid inhalation of vapors or mist. Personal contact with the product should be avoided. Should contact be made, remove saturated clothing and flush affected skin areas with water. Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in this sheet must be observed. Do not flame cut or weld empty drums.

THE INFORMATION CONTAINED HEREIN IS BASED ON INFORMATION RECEIVED FROM OUR RAW MATERIAL SUPPLIERS AND OTHER SOURCES AND IS BELIEVED TO BE RELIABLE. THIS INFORMATION IS NOT TO BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH SPRAYLAT CORP. ASSUMES LEGAL RESPONSIBILITY. INFORMATION ON THIS FORM IS TO BE USED TO COMPLY WITH OSHA AND HEALTH REGULATIONS ONLY AND MAY NOT BE USED OR DISSEMINATED FOR OTHER PURPOSES.

MATERIAL SAFETY DATA SHEET
FOR COATINGS, RESINS AND RELATED MATERIALS

PAGE 1

Company Name: SPRAYLAT CORPORATION
 Address: 716 SOUTH COLUMBUS AVENUE, MOUNT VERNON, NY 10550
 Telephone: (914) 699-3030 (Emergency and Information)
 Date Prepared: 10/19/89 (Note: Supersedes all previous MSDS)

SECTION I PRODUCT IDENTIFICATION

PRODUCT CLASS: PAINT ADDITIVE - Polymeric Hexamethylene Diisocyanate (PHD)
 PRODUCT NAME: 599-A8574-1 PART A
 CHEMICAL FAMILY: Aliphatic Polyisocyanate
 CHEMICAL NAME: 1,6-Hexamethylene Diisocyanate Based Polyisocyanate

SECTION II HAZARDOUS INGREDIENTS

--- INGREDIENT(S) --- MATERIAL DESCRIPTION	CAS #	% WT	OSHA-PEL PPM	ACGIH-TLV TWA-PPM	OTHER LIMITS
Homopolymer of HDI	28182-81-2	75	Not Est.	Not Est.	MGL* -1 mg/m ³
Hexamethylene Diisocyanate	822-06-0	(a)	Not Est.	0.005	MGL - .02 ppm
Xylene	1330-20-7	12.5	100	100	STEL-150 ppm
n-Butyl Acetate (BA)	123-86-4	12.5	150	150	STEL-200 ppm

* MGL - recommended Manufacturer's Guideline Level

(a) - Residual monomer content less than 0.7% based on resin solids at the time of manufacture. However, after 3-6 months storage, the free monomer content may rise to a maximum of 1.6%.

SECTION III PHYSICAL DATA

COLOR:	Clear Pale Yellow	APPEARANCE:	Liquid
MOLECULAR WT:	Approx. 500 (polyisocyanate)	ODOR:	Of Solvent
BOILING PT:	Not Est.	FREEZE PT:	Not Est.
SPECIFIC GRAVITY:	1.06 @ 68°F (20°C)	BULK DENSITY:	8.85 lbs/gal
% VOLATILE:	Approximately 30% (by volume)		
WATER SOLUBILITY:	Resin is insoluble - reacts slowly with water to liberate CO ₂ gas		
VAPOR PRESSURE:	Polyisocyanate: Approx. 7.5 x 10 ⁻⁵ mm Hg @ 20°C		
	Butyl Acetate: 15 mm Hg @ 20°C		
	Xylene: 9 mm Hg @ 20°C		

SECTION IV FIRE AND EXPLOSION DATA

FLASH POINT: 91°F (32.7°C) Pensky-Martens Closed Cup (ASTM D-93)

FLAMMABLE LIMITS - % by Volume	BA	Xylene
Lel:	1.38	1.0
Uel:	7.6	7.0

EXTINGUISHING MEDIA: Dry chemical, CO₂, Foam or Water spray for large fires.

SPECIAL FIRE FIGHTING PROCEDURES/UNUSUAL FIRE OR EXPLOSION HAZARDS:

Full emergency equipment with self-contained breathing apparatus and full protective clothing should be worn by firefighters. During a fire, HDI vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion (see Section VIII). Isolate from heat, electrical equipment, sparks and open flame. Closed container may explode when exposed to extreme heat or burst when contaminated with water (CO₂ evolved). Solvent vapors may be heavier than air. Stagnant air may cause vapors to accumulate and travel along the ground to an ignition source which may result in a flashback to the source of the vapors.

SECTION V HUMAN HEALTH DATA (CONTINUED)

EYE CONTACT:

Acute Exposure. Liquid, aerosols and vapors of this product (isocyanate and solvents) are irritating and can cause tearing, reddening and swelling accompanied by a stinging sensation and/or feeling like that of fine dust in the eyes.

Chronic Exposure. None found

INGESTION:

Acute Exposure. Can result in irritation and possible corrosive action in the mouth, stomach tissue and digestive tract. Vomiting may cause aspiration of the solvent, resulting in chemical pneumonitis.

Chronic Exposure. None found

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Asthma and other respiratory disorders (bronchitis, emphysema, hyperactivity), skin allergies, eczema.

CARCINOGENICITY: NTP: Not listed IARC: Not listed OSHA: Not regulated

EXPOSURE LIMITS: Not established for product as a whole. Refer to Section II for exposure limits of hazardous constituents. The MGL of 1 mg/m³ for the Homopolymer of HDI and 0.02 ppm ceiling for HDI monomer are internal guides based on limited data; they are provided as guides pending the review of future data.

SECTION VI EMERGENCY & FIRST AID PROCEDURES

EYE CONTACT: Flushing with clean, lukewarm water (low pressure) for at least 15 minutes, while lifting eyelids. Refer individual to physician or ophthalmologist for immediate follow-up.

SKIN CONTACT: Remove contaminated clothing immediately. Wash affected areas thoroughly with soap and water. Wash contaminated clothing thoroughly before reuse. For severe exposures, get under safety shower after removing clothing, then get medical attention. For lesser exposures, seek medical attention if irritation develops or persists.

INHALATION: Move to an area free from risk of further exposure. Administer oxygen or artificial respiration as needed. Obtain medical attention. Asthmatic type symptoms may develop and may be immediate or delayed up to several hours. Treatment is essentially symptomatic. Consult physician.

INGESTION: DO NOT INDUCE VOMITING. Give 1 to 2 cups of milk or water to drink. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON. Consult physician.

NOTE TO PHYSICIAN:

Eyes: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic/steroid preparation frequently. Workplace vapors could produce reversible corneal epithelial edema impairing vision.

Skin: This product is a known skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burn.

Ingestion: Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of the product.

Inhalation: This product is a known pulmonary sensitizer. Treatment is essentially symptomatic.

An individual having a dermal or pulmonary sensitization reaction to this material must be removed from any further exposure to any isocyanate.

SECTION VII EMPLOYEE PROTECTION RECOMMENDATIONS (CONTINUED)

At least an air purifying (organic vapor) respirator is required when:

- the airborne concentrations of the isocyanate monomer exceed the TLV of 0.005 ppm but are below 0.05 ppm (10 times the TLV), or
- the airborne concentrations of the polyisocyanate (polymeric, oligomeric) exceed the MGL of 1 mg/m³ but are below 10 mg/m³ (10 times MGL)

MONITORING: Refer to Patty's Industrial Hygiene and Toxicology-Volume I (3rd edition) Chapter 17 and Volume III (1st edition) Chapter 3 - for guidance concerning appropriate air sampling strategy to determine airborne concentrations.

OTHER: Safety showers and eyewash stations should be available. Educate and train employees in safe use of product. Follow all label instructions. For additional information, contact Spraylat Corporation.

SECTION VIII REACTIVITY DATA

STABILITY: Stable under normal conditions.

POLYMERIZATION: May occur if in contact with moisture or other materials which react with isocyanates. May occur at temperatures over 400°F (204°C).

INCOMPATIBILITY (MATERIALS TO AVOID): Water, amines, strong bases, alcohols, metal compounds and surface active materials.

HAZARDOUS DECOMPOSITION PRODUCTS: By high heat and fire: carbon dioxide, carbon monoxide, oxides of nitrogen, HCN, HDI.

SECTION IX SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Evacuate nonessential personnel. Remove all sources of ignition and ventilate the area. Notify appropriate authorities if necessary. Put on personal protective Equipment (see Section VII). Dike or impound spilled material and control further spillage if feasible. Cover the spill with sawdust, vermiculate, Fuller's earth or other absorbent material. Pour decontamination solution over spill area and allow to react for at least 10 minutes. Collect material in open containers and add further amounts of decontamination solution. Remove containers to a safe place, cover loosely, and allow to stand for 24 to 48 hours. Wash down spill area with decontamination solutions.

Decontamination solutions: nonionic surfactant Union Carbide's Tergitol TMN-10 (20%) and water (80%); concentrated ammonia (3-8%), detergent (2%) and water (90-95%).

WASTE DISPOSAL METHOD: Waste must be disposed of in accordance with federal, state and local environmental control regulations. Incineration is the preferred method. Empty containers must be handled with care due to product residue and flammable solvent vapor. Decontaminate containers prior to disposal. DO NOT HEAT OR CUT EMPTY CONTAINER WITH ELECTRIC OR GAS TORCH. (See Sections IV and VIII).

SECTION X SPECIAL PRECAUTIONS & STORAGE DATA

STORAGE TEMPERATURE (MIN./MAX): -30°F (-34°C)/122°F (50°C)

AVERAGE SHELF LIFE: 6 months at 77°F (25°C) after receipt of material.

SPECIAL SENSITIVITY: If container is exposed to high heat, it can be pressurized and possibly rupture explosively. HDI reacts slowly with water to form CO₂ gas. This gas can cause sealed containers to expand and possibly rupture explosively.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Keep away from heat, sparks and open flame. Ground containers during storage and transfer operations. Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. At maximum storage temperatures noted, material may slowly polymerize without hazard. Ideal storage temperature range for ease of handling is 50-81°F (10-27°C). Avoid contact with skin and eyes. Employee education and training in the safe use and handling of this product are required under the OSHA Hazard Communication Standard.

SECTION XIII REGULATORY INFORMATION

OSHA HSC STATUS: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA STATUS: On TSCA Inventory

CERCLA REPORTABLE QUANTITY: Xylene: 1000 lbs Butyl Acetate: 5000 lbs

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA), TITLE III:

- Section 302 - Extremely Hazardous Substances: None
- Section 311/312 - Hazard Categories: Immediate health hazard; Delayed health hazard; Fire hazard; Reactive hazard
- Section 313 - Toxic Chemicals: Xylene (CAS# 1330-20-7) 12.5%

RCRA STATUS: When discarded in its purchased form, this product meets the criteria of ignitability and should be managed as a hazardous waste (EPA Hazardous Waste Number D001). (40 CFR 261.20-24)

STATE REGULATORY INFORMATION

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

COMPONENT NAME	CAS NUMBER	CONCENTRATION	STATE CODE
Homopolymer of HDI	28182-81-2	75%	PA2
Xylene	1330-20-7	12.5%	PA1, MA, NJ
n-Butyl Acetate	123-86-4	12.5%	PA1, MA, NJ

MA = Massachusetts Hazardous Substance List
 NJ = New Jersey Hazardous Substance List
 PA1 = Pennsylvania Hazardous Substance List
 PA2 = Pennsylvania Non-Hazardous present at 3% or greater

CALIFORNIA PROPOSITION 65

To the best of our knowledge, this product contains no levels of listed substances, which the State of California has found to cause cancer, birth defects or other reproductive effects.

 THE INFORMATION CONTAINED HEREIN IS BASED ON INFORMATION RECEIVED FROM OUR RAW MATERIAL SUPPLIERS AND OTHER SOURCES AND IS BELIEVED TO BE RELIABLE. THIS INFORMATION IS NOT TO BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH SPRAYLAT CORP. ASSUMES LEGAL RESPONSIBILITY. INFORMATION ON THIS FORM IS TO BE USED TO COMPLY WITH OSHA & HEALTH REGULATIONS ONLY AND MAY NOT BE USED OR DISSEMINATED FOR OTHER PURPOSE.



MATERIAL SAFETY DATA SHEET

MSDS NUMBER

7,750-7

PAGE 1

97367 (4-85)

24 HOUR EMERGENCY ASSISTANCE			GENERAL MSDS ASSISTANCE		
SHELL: 713-473-9461 CHEMTREC: 800-424-9300			SHELL: 713-241-4819		
ACUTE HEALTH + 3	FIRE 3	REACTIVITY 0	HAZARD RATING LEAST - 0 SLIGHT - 1 MODERATE - 2 HIGH - 3 EXTREME - 4		
*For acute and chronic health effects refer to the discussion in Section III					



SECTION I		NAME	
PRODUCT	TOLUENE		
CHEMICAL NAME	BENZENE, METHYL-		
CHEMICAL FAMILY	AROMATIC HYDROCARBON		
SHELL CODE	83380 83381		

SECTION II-A		PRODUCT/INGREDIENT	
NO.	COMPOSITION	CAS NUMBER	PERCENT
P	TOLUENE	108-88-3	100

SECTION II-B		ACUTE TOXICITY DATA	
NO.	ACUTE ORAL LD50	ACUTE DERMAL LD50	ACUTE INHALATION LC50
P	5.0 G/KG (RAT)	14 G/KG (RABBIT)	8000 PPM/4H (RAT)

SECTION III HEALTH INFORMATION

THE HEALTH EFFECTS NOTED BELOW ARE CONSISTENT WITH REQUIREMENTS UNDER THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200).

EYE CONTACT

LIQUID IS SEVERELY IRRITATING TO THE EYES.

SKIN CONTACT

LIQUID IS MILDLY IRRITATING TO THE SKIN. PROLONGED OR REPEATED LIQUID CONTACT CAN RESULT IN DEFATTING AND DRYING OF THE SKIN WHICH MAY RESULT IN SKIN IRRITATION AND DERMATITIS.

INHALATION

EXPOSURE TO HIGH CONCENTRATIONS MAY RESULT IN CNS DEPRESSION.

INGESTION

INGESTION OF PRODUCT MAY RESULT IN VOMITING; ASPIRATION (BREATHING) OF VOMITUS INTO THE LUNGS MUST BE AVOIDED AS EVEN SMALL QUANTITIES MAY RESULT IN ASPIRATION PNEUMONITIS.

SIGNS AND SYMPTOMS

IRRITATION AS NOTED ABOVE. EARLY TO MODERATE CNS (CENTRAL NERVOUS SYSTEM) DEPRESSION MAY BE EVIDENCED BY GIDDINESS, HEADACHE, DIZZINESS AND NAUSEA; IN EXTREME CASES, UNCONSCIOUSNESS AND DEATH MAY OCCUR. ASPIRATION PNEUMONITIS MAY BE EVIDENCED BY COUGHING, LABORED BREATHING AND CYANOSIS (BLUISH SKIN); IN SEVERE CASES DEATH MAY RESULT.

AGGRAVATED MEDICAL CONDITIONS

PREEXISTING EYE, SKIN, RESPIRATORY DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT.

OTHER HEALTH EFFECTS

INTENTIONAL ABUSE, MISUSE OR OTHER MASSIVE EXPOSURE MAY CAUSE MULTIPLE ORGAN DAMAGE AND/OR DEATH. SEE SECTION VI FOR SUPPLEMENTAL INFORMATION.

SECTION IV**OCCUPATIONAL EXPOSURE LIMITS**

NO.	OSHA PEL/TWA	OSHA PEL/CEILING	ACGIH TLV/TWA	ACGIH TLV/STEL	OTHER
P	100 PPM		100 PPM	150 PPM	150 PPM*

*OSHA PEL/STEL

SECTION V**EMERGENCY AND FIRST AID PROCEDURES****EYE CONTACT**

IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.

SKIN CONTACT

FLUSH SKIN WITH WATER. IF IRRITATION OCCURS, GET MEDICAL ATTENTION.

INHALATION

REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION.

INGESTION

DO NOT INDUCE VOMITING. IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION.*

NOTE TO PHYSICIAN

*IF MORE THAN 2.0 ML PER KG HAS BEEN INGESTED AND VOMITING HAS NOT OCCURRED, EMESIS SHOULD BE INDUCED WITH SUPERVISION. KEEP VICTIM'S HEAD BELOW HIPS TO PREVENT ASPIRATION. IF SYMPTOMS SUCH AS LOSS OF GAG REFLEX, CONVULSIONS OR UNCONSCIOUSNESS OCCUR BEFORE EMESIS, GASTRIC LAVAGE USING A CUFFED ENDOTRACHEAL TUBE SHOULD BE CONSIDERED.

SECTION VI**SUPPLEMENTAL HEALTH INFORMATION**

WHILE THERE IS NO EVIDENCE THAT INDUSTRIALLY ACCEPTABLE LEVELS OF TOLUENE VAPORS (E.G., THE TLV) HAVE PRODUCED CARDIAC EFFECTS IN HUMANS, ANIMAL STUDIES HAVE SHOWN THAT INHALATION OF HIGH LEVELS OF TOLUENE PRODUCED CARDIAC SENSITIZATION. SUCH SENSITIZATION MAY CAUSE FATAL CHANGES IN HEART RHYTHMS. THIS LATTER EFFECT WAS SHOWN TO BE ENHANCED BY HYPOXIA OR THE INJECTION OF ADRENALIN-LIKE AGENTS. RATS EXPOSED TO 1400 PPM OR 1200 PPM OF TOLUENE FOR 14H/DAY FOR 4 OR 5 WEEKS (RESPECTIVELY) EXHIBITED HIGH FREQUENCY HEARING DEFICITS. THE SIGNIFICANCE OF THIS INFORMATION TO MAN IS UNKNOWN.

SECTION VIIPHYSICAL DATA
-----BOILING POINT: 231
(DEG F)SPECIFIC GRAVITY: 0.87
(H2O=1)VAPOR PRESSURE: 22 @ 68 DEG F.
(MM HG)MELTING POINT: -139
(DEG F)SOLUBILITY: NEGLIGIBLE
(IN WATER)VAPOR DENSITY: 3.2
(AIR=1)

EVAPORATION RATE (N-BUTYL ACETATE = 1): 2.0

APPEARANCE AND ODOR:

COLORLESS MOBILE LIQUID. AROMATIC, BENZENE-LIKE ODOR.

SECTION VIIIFIRE AND EXPLOSION HAZARDS
-----FLASH POINT AND METHOD:
40 DEG F. (TCC)FLAMMABLE LIMITS /% VOLUME IN AIR
LOWER: 1 UPPER: 7

EXTINGUISHING MEDIA

USE WATER FOG, FOAM, DRY CHEMICAL OR CO2. DO NOT USE A DIRECT STREAM OF WATER. PRODUCT WILL FLOAT AND CAN BE REIGNITED ON SURFACE OF WATER.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS

WARNING. FLAMMABLE. CLEAR FIRE AREA OF UNPROTECTED PERSONNEL. DO NOT ENTER CONFINED FIRE SPACE WITHOUT FULL BUNKER GEAR (HELMET WITH FACE SHIELD, BUNKER COATS, GLOVES AND RUBBER BOOTS), INCLUDING A POSITIVE PRESSURE NIOSH APPROVED SELF-CONTAINED BREATHING APPARATUS. COOL FIRE EXPOSED CONTAINERS WITH WATER.

UNUSUAL FIRE AND EXPLOSION HAZARDS

CONTAINERS EXPOSED TO INTENSE HEAT FROM FIRES SHOULD BE COOLED WITH WATER TO PREVENT VAPOR PRESSURE BUILDUP WHICH COULD RESULT IN CONTAINER RUPTURE. CONTAINER AREAS EXPOSED TO DIRECT FLAME CONTACT SHOULD BE COOLED WITH LARGE QUANTITIES OF WATER AS NEEDED TO PREVENT WEAKENING OF CONTAINER STRUCTURE.

SECTION IXREACTIVITY

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS AND MATERIALS TO AVOID:

AVOID HEAT, SPARKS, FLAME AND CONTACT WITH STRONG OXIDIZING AGENTS.

HAZARDOUS DECOMPOSITION PRODUCTS

CARBON MONOXIDE AND UNIDENTIFIED ORGANIC COMPOUNDS MAY BE FORMED DURING COMBUSTION.

SECTION XEMPLOYEE PROTECTION

RESPIRATORY PROTECTION

AVOID PROLONGED OR REPEATED BREATHING OF VAPORS. IF EXPOSURE MAY OR DOES EXCEED OCCUPATIONAL EXPOSURE LIMITS (SEC. IV) USE A NIOSH-APPROVED RESPIRATOR TO PREVENT OVEREXPOSURE. IN ACCORD WITH 29 CFR 1910.134 USE EITHER AN ATMOSPHERE-SUPPLYING RESPIRATOR OR AN AIR-PURIFYING RESPIRATOR FOR ORGANIC VAPORS.

OSHA HAS ESTABLISHED TRANSITIONAL OCCUPATIONAL EXPOSURE LIMITS FOR THIS PRODUCT AND/OR COMPONENTS OF THIS PRODUCT. REFER TO 29 CFR 1910.1000 FOR THESE TRANSITIONAL LIMITS AND REQUIREMENTS FOR MEETING THESE LIMITS.

PROTECTIVE CLOTHING

AVOID CONTACT WITH EYES. WEAR CHEMICAL GOGGLES IF THERE IS LIKELIHOOD OF CONTACT WITH EYES. AVOID PROLONGED OR REPEATED CONTACT WITH SKIN. WEAR CHEMICAL-RESISTANT GLOVES AND OTHER CLOTHING AS REQUIRED TO MINIMIZE CONTACT. TEST DATA INDICATE THE BEST PROTECTION IS PROVIDED BY PVA GLOVES.

ADDITIONAL PROTECTIVE MEASURES

USE EXPLOSION-PROOF VENTILATION AS REQUIRED TO CONTROL VAPOR CONCENTRATIONS. AIR-DRY CONTAMINATED CLOTHING IN A WELL VENTILATED AREA BEFORE LAUNDERING.

SECTION XI**ENVIRONMENTAL PROTECTION****SPILL OR LEAK PROCEDURES**

WARNING. FLAMMABLE. ELIMINATE ALL IGNITION SOURCES. HANDLING EQUIPMENT MUST BE GROUNDED TO PREVENT SPARKING. *** LARGE SPILLS *** EVACUATE THE HAZARD AREA OF UNPROTECTED PERSONNEL. WEAR APPROPRIATE RESPIRATOR AND PROTECTIVE CLOTHING. SHUT OFF SOURCE OF LEAK ONLY IF SAFE TO DO SO. DIKE AND CONTAIN. IF VAPOR CLOUD FORMS, WATER FOG MAY BE USED TO SUPPRESS; CONTAIN RUN-OFF. REMOVE WITH VACUUM TRUCKS OR PUMP TO STORAGE/SALVAGE VESSELS. SOAK UP RESIDUE WITH AN ABSORBENT SUCH AS CLAY, SAND OR OTHER SUITABLE MATERIAL; PLACE IN NON-LEAKING CONTAINERS FOR PROPER DISPOSAL. FLUSH AREA WITH WATER TO REMOVE TRACE RESIDUE; DISPOSE OF FLUSH SOLUTIONS AS ABOVE. *** SMALL SPILLS *** TAKE UP WITH AND ABSORBENT MATERIAL AND PLACE IN NON-LEAKING CONTAINERS; SEAL TIGHTLY FOR PROPER DISPOSAL.

SECTION XII**SPECIAL PRECAUTIONS**

KEEP LIQUID AND VAPOR AWAY FROM HEAT, SPARKS AND FLAME. SURFACES THAT ARE SUFFICIENTLY HOT MAY IGNITE EVEN LIQUID PRODUCT IN THE ABSENCE OF SPARKS OR FLAME. EXTINGUISH PILOT LIGHTS, CIGARETTES AND TURN OFF OTHER SOURCES OF IGNITION PRIOR TO USE AND UNTIL ALL VAPORS ARE GONE. VAPORS MAY ACCUMULATE AND TRAVEL TO IGNITION SOURCES DISTANT FROM THE HANDLING SITE; FLASH-FIRE CAN RESULT. KEEP CONTAINERS CLOSED WHEN NOT IN USE. USE WITH ADEQUATE VENTILATION.

CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, CAN CONTAIN EXPLOSIVE VAPORS. DO NOT CUT, DRILL, GRIND, WELD OR PERFORM SIMILAR OPERATIONS ON OR NEAR CONTAINERS.

STATIC ELECTRICITY MAY ACCUMULATE AND CREATE A FIRE HAZARD. GROUND FIXED EQUIPMENT. BOND AND GROUND TRANSFER CONTAINERS AND EQUIPMENT.

SECTION XIII**TRANSPORTATION REQUIREMENTS**

DEPARTMENT OF TRANSPORTATION CLASSIFICATION:
FLAMMABLE LIQUID

D.O.T. PROPER SHIPPING NAME:
TOLUENE

OTHER REQUIREMENTS:

UN1294. GUIDE SHEET 27. RQ TOLUENE (1000 LB).

SECTION XIV**OTHER REGULATORY CONTROLS**

THIS PRODUCT IS LISTED ON THE EPA/TSCA INVENTORY OF CHEMICAL SUBSTANCES

IN ACCORDANCE WITH SARA TITLE III, SECTION 313, THE EDS SHOULD ALWAYS BE COPIED AND SENT WITH THE MSDS.

SECTION XV**SPECIAL NOTES**

THE OCCUPATIONAL EXPOSURE LIMITS (SECTION IV) AND/OR THE RESPIRATORY PROTECTION PRECAUTIONS (SECTION X) HAVE BEEN REVISED.

THE INFORMATION CONTAINED HEREIN IS BASED ON THE DATA AVAILABLE TO US AND IS BELIEVED TO BE CORRECT. HOWEVER, SHELL MAKES NO WARRANTY, EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. SHELL ASSUMES NO RESPONSIBILITY FOR INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN.

DATE PREPARED: JULY 19, 1989

BE SAFE

READ OUR PRODUCT
SAFETY INFORMATION ...AND PASS IT ON
(PRODUCT LIABILITY LAW
REQUIRES IT)

J. C. WILLETT

SHELL OIL COMPANY
PRODUCT SAFETY AND COMPLIANCE
P. O. BOX 4320
HOUSTON, TX 77210



ENVIRONMENTAL DATA SHEET

EDS NUMBER ▶ 7,750

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97449 (9-87)

PRODUCT ▶	TOLUENE		
PRODUCT CODE ▶	83380	83381	

SECTION I		PRODUCT/COMPOSITION		
NO.	COMPONENT	CAS NUMBER	PERCENT	
P	TOLUENE	108-88-3	100	

SECTION II		SARA TITLE III INFORMATION			
NO.	EHS RQ (LBS) (*1)	EHS TPQ (LBS) (*2)	SEC 313 (*3)	313 CATEGORY (*4)	311/312 CATEGORIES (*5)
P			YES		H-1, H-2, P-3

FOOTNOTES

- *1 = REPORTABLE QUANTITY OF EXTREMELY HAZARDOUS SUBSTANCE, SEC.302
- *2 = THRESHOLD PLANNING QUANTITY, EXTREMELY HAZARDOUS SUBSTANCE, SEC 302
- *3 = TOXIC CHEMICAL, SEC 313
- *4 = CATEGORY AS REQUIRED BY SEC 313 (40 CFR 372.65 C), MUST BE USED ON TOXIC RELEASE INVENTORY FORM
- *5 = HAZARD CATEGORY FOR SARA SEC. 311/312 REPORTING
 - HEALTH H-1 = IMMEDIATE (ACUTE) HEALTH HAZARD H-2 = DELAYED (CHRONIC) HEALTH HAZARD
 - PHYSICAL P-3 = FIRE HAZARD P-4 = SUDDEN RELEASE OF PRESSURE HAZARD
 - P-5 = REACTIVE HAZARD

SECTION III ENVIRONMENTAL RELEASE INFORMATION

UNDER EPA-CERLA ("SUPERFUND") RELEASES TO AIR, LAND OR WATER WHICH EXCEED THE REPORTABLE QUANTITY MU REPORTED TO THE NATIONAL RESPONSE CENTER, 800-424-8802.

THE REPORTABLE QUANTITY (RQ) FOR THIS PRODUCT IS 1,000 LBS., WHICH IS BASED ON THE PRESENCE OF PRODU

SECTION IV RCRA INFORMATION

UNDER EPA - RCRA (40 CFR 261.33), IF TOLUENE BECOMES A WASTE MATERIAL, IT WOULD BE A HAZARDOUS WASTE HAZARDOUS WASTE NUMBER U220. REFER TO LATEST EPA OR STATE REGULATIONS REGARDING PROPER DISPOSAL.

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DATE PREPARED: JANUARY 22, 1988

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FOR ADDITIONAL INFORMATION ON THIS ENVIRONMENTAL DATA PLEASE CALL
(713) 241-2252

FOR EMERGENCY ASSISTANCE PLEASE CALL

SHELL: (713) 473-9461
CHEMTREC: (800) 424-9300